

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AVH/JS/P96135WO		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/GB2005/000968		International filing date (day/month/year) 15.03.2005		Priority date (day/month/year) 18.03.2004
International Patent Classification (IPC) or national classification and IPC INV. F16L11/08 F16L11/24				
Applicant BELLAMY, Norman West et al.				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 9 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 18.10.2005		Date of completion of this report 16.06.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Dauvergne, B Telephone No. +49 89 2399-7527		



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International application No.
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Box No. I Basis of the report

1. With regard to the **language**, this report is based on

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-40 as originally filed

Claims, Numbers

1-44 filed with telefax on 17.01.2006

Drawings, Sheets

1/20-20/20 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing *(specify):*
- ☐ any table(s) related to sequence listing *(specify):*

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing *(specify):*
- ☐ any table(s) related to sequence listing *(specify):*

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☒ the entire international application,

☐ claims Nos.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):

☒ the claims, or said claims Nos. 1-26 are so inadequately supported by the description that no meaningful opinion could be formed (*specify*).

see separate sheet

☒ no international search report has been established for the said claims Nos. 1-44

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13*ter*.1(a) or (b) and 13*ter*.2.

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions, and such tables were not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

☐ See separate sheet for further details

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Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

As stated in the search report, the separate groups of inventions of the original application were:

- Claims 1-12,
- Claims 13-24,
- Claim 25,
- Claim 26,
- Claims 27-31,
- Claims 32-36,
- Claims 37-38,
- Claims 39-44.

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the reasons expressed in the search report.

The amendments introduce subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT. The amendments concerned are those relating, in claim 1, to:

'lining said pipe with said structural layer comprises introducing at least one strip to said pipe, and arranging the or each said strip to form a continuous lining within said pipe.'

New claim 1 is meant to be based on old claim 13, which was a different subject matter from old claim 1.

Original claim 13 read:

A method of lining a pipe comprising:

- lining said pipe with a structural layer for providing structural integrity; and
- lining said pipe with a containment layer for providing fluid impermeability;
- wherein lining said pipe with a structural layer comprises arranging said structural layer to form a substantially continuous lining within said pipe.

Turning now to the subject matter of new claim 1 (partly based on old claim 13), it can be seen that there is no basis for new claim 1 in original claims 13-24.

In the claims of original claims 13-24, in the only claims that mention a strip:

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- Original claim 17 refers to helically winding, which is not in new claim 1,
- Original claim 18 refers to two structural layers, which is not in new claim 1,
- Original claim 19 refers to helically winding, which is not in new claim 1,
- Original claim 21 refers to helically winding, which is not in new claim 1.

Thus, there is no basis in the original application for new claim 1, which is a combination of 2 different subject matters, combination not present in the original application.

No search has been carried out for the subject matter of new claim 1, new claim 1 can thus not be examined.

As a consequence, claims 2-26 which, as stated in the telefax of 17/01/06, all refer to new claim 1, can also not be examined.

Claims 27-44 refer to subject matter for which no search has been carried out. These claims should not be examined.

Claims

- 1 A method of lining a pipe comprising:

lining said pipe with a structural layer for providing structural integrity; and

lining said pipe with a containment layer for providing fluid impermeability;

wherein, lining said pipe with said structural layer comprises introducing at least one strip to said pipe, and arranging the or each said strip to form a substantially continuous lining within said pipe.
- 2 A method of lining a pipe as claimed in claim 1 wherein lining said pipe with said containment layer comprises arranging at least one section of sheet lining material to form a tubular lining and seaming said tubular lining to render it substantially impermeable.
- 3 A method of lining a pipe as claimed in claim 1 or 2 wherein the containment layer is provided concentrically within the structural layer the containment layer being bonded to at least a portion of an internal surface of the structural layer.
- 4 A method of lining a pipe as claimed in claim 1 or 2 wherein the containment layer is provided concentrically outside the structural layer.
- 5 A method of lining a pipe as claimed in any of claims 1 to 3 wherein, lining said pipe with a structural layer comprises helically winding the or each strip to form a plurality of turns, each turn being in substantial helical contact with the previous turn thereby forming a substantially continuous tubular structural layer within said pipe.
- 6 A method of lining a pipe as claimed in any of claims 1 to 5 wherein the structural layer is a first structural layer, and the method further comprises lining the pipe with a further structural layer, the further layer comprising at least one further strip of said

structural lining material arranged to form a substantially continuous lining within said pipe.

- 7 A method of lining a pipe as claimed in claim 6 lining said pipe with said further structural layer comprises helically winding the or each further strip to form a plurality of turns, each turn being in substantial helical contact with the previous turn thereby forming a substantially continuous tubular structural layer within said pipe.
- 8 A method of lining a pipe as claimed in claim 6 or 7 wherein the first structural layer is provided concentrically within the further structural layer.
- 9 A method of lining a pipe as claimed in any of claims 6 to 8 wherein:

lining the pipe with a first structural layer comprises helically winding the or each corresponding strip in a first helical direction to form a substantially continuous tubular lining within said pipe; and

and lining the pipe with the further structural layer comprises helically winding the or each further strip in a second helical direction to form a substantially continuous tubular lining within said pipe;

wherein, the first and second helical directions are opposite.

- 10 A method of lining a pipe as claimed in any of claims 1 to 9 wherein the containment layer is a first containment layer, and the method further comprises lining the pipe with a further containment layer by arranging at least one further section of lining material to form a tubular lining and seaming said tubular lining to render it substantially impermeable.
- 11 A method of lining a pipe as claimed in claim 10 wherein the or at least one structural layer is provided between the first and further containment layers.

12 A method of lining a pipe as claimed in any of claims 1 to 11 wherein the method further comprises lining the pipe with at least three containment layers and at least two structural layers, the containment layers being separated from one another by a corresponding structural layer.

13 A method of lining a pipe as claimed in any of claims 1 to 12 wherein the method further comprises:

providing a test structure for testing the fluid impermeability of said containment layer of a composite lining said structure comprising:

a seam provided along a longitudinal length of said containment layer, the seam comprising at least two substantially parallel seamed regions;

and a conduit formed between said seamed regions.

14 A method of lining a pipe as claimed in claim 13 wherein the method further comprises:

testing the fluid impermeability of said containment layer

by pressurising said conduit with a fluid; and

determining if said fluid is leaking from either of said parallel seamed regions.

15 A composite lining for a pipe when produced by a method according to any of claims 1 to 12 comprising:

at least one structural layer for providing structural integrity, the structural layer comprising at least one strip of structural lining material arranged to form a substantially continuous lining within said pipe; and

at least one containment layer for providing fluid impermeability.

- 16 A composite lining as claimed in claim 15 wherein the containment layer comprises at least one section of lining material arranged to form a substantially continuous impermeable tubular lining within said pipe.
- 17 A composite lining as claimed in claim 15 or 16 wherein, the containment layer is provided concentrically within the structural layer the containment layer being bonded to at least a portion of an internal surface of the structural layer.
- 18 A composite lining as claimed in claim 15 or 16 wherein, the containment layer is provided concentrically outside the structural layer.
- ~~19 A composite layer as claimed in any of claims 15 to 18 wherein, the structural layer~~
comprises the or each strip helically wound to form a plurality of turns, each turn being in substantial helical contact with the previous turn thereby forming a substantially continuous tubular lining within said pipe.
- 20 A composite lining as claimed in any of claims 15 to 19 wherein the structural layer is a first structural layer, and the composite lining is provided with a further structural layer, the further layer comprising at least one strip of lining material arranged to form a substantially continuous lining within said pipe.
- 21 A composite lining as claimed in claim 20 the further structural layer comprises at least one further strip helically wound to form a plurality of turns, each turn being in substantial helical contact with the previous turn thereby forming a substantially continuous tubular lining within said pipe.
- 22 A composite lining as claimed in claim 20 or 21 wherein the first structural layer is provided concentrically within the further structural layer.
- 23 A composite lining as claimed in claim 20, 21, or 22 wherein:

the first structural layer comprises the or each corresponding strip helically wound in a first helical direction to form a substantially continuous tubular lining within said pipe; and

the further structural layer comprises the or each further strip helically wound in a second helical direction to form a substantially continuous tubular lining within said pipe;

and wherein, the first and second helical directions are opposite.

- 24 A composite lining as claimed in any of claims 15 to 23 wherein the containment layer is a first containment layer, and the composite lining is provided with a further containment layer, the further containment layer comprising at least one section of lining material arranged to form a substantially impermeable tubular lining within said pipe.

- 25 A composite lining as claimed in claim 24 wherein the or at least one structural layer is provided between the first and further containment layers.

- 26 A composite lining as claimed in any of claims 15 to 25 comprising at least three containment layers and at least two structural layers, the containment layers being separated from one another by a corresponding structural layer.

- 27 An apparatus for providing a loosely twisted helical strip of lining material for lining a pipe, the apparatus comprising:

a base portion; and

coil support means rotatably mounted on said base portion for supporting a coil of said lining material and for allowing a strip of said lining material to be dispensed from said coil;

the coil support means being rotatable in a controlled manner relative to said base portion for inducing helical twists in said strip of lining material.

28 An apparatus as claimed in claim 27, wherein:

said coil support means is configured to dispense said strip from a centremost end of said coil, thereby allowing a strip with a naturally induced helical twist to be dispensed;

said naturally induced twist being additional to any rotation induced twist.

29 An apparatus as claimed in claim 27 or 28, wherein:

said coil support means is provided with a strip dispensing portion comprising an aperture for dispensing said strip through;

said strip dispensing platform being rotatable independent of said coil support means relative to said base portion.

30 An apparatus as claimed in claim 27, 28 or 29, wherein:

said coil support means is rotatably mounted on said base portion for rotation about the axial centre of said coil.

31 An apparatus as claimed in any of claims claim 27 to 30, wherein:

said coil support means is rotatably mounted on said base portion for rotation about an axis substantially perpendicular to the axial centre of said coil.

32 An apparatus for helically lining a pipe with a strip of lining material, the apparatus comprising:

a winding rig comprising helical winding means;

said helical winding means being configured for helically winding said strip into a helically wound lining layer for lining an inside surface either of said pipe or of a previously laid lining layer.

33 An apparatus for helically lining a pipe as claimed in claim 32 wherein,

said winding means is configured for helically winding said strip directly onto said inside surface;

and said winding rig is configured for longitudinal travel along said pipe as each turn of said helically wound lining layer is formed on said inside surface.

34 An apparatus for helically lining a pipe as claimed in claim 32 or 33 wherein,

said winding means is configured for helically winding said strip directly onto said inside surface;

and said winding rig is configured for free rotation about a longitudinal axis of said pipe as each turn of said helically wound lining layer is formed on said inside surface.

35 An apparatus for helically lining a pipe as claimed in claims 32 wherein,

said winding means is configured for winding said lining strip into a helically wound portion layer, and for driving said helically wound tubular portion along said pipe thereby to form said helically wound lining layer on said inside surface.

36 An apparatus for helically lining a pipe as claimed in claims 35 wherein, said winding means comprises:

a cylinder rotatably mountable on an end of said pipe for winding said lining strip onto an internal surface thereof thereby to form said helically wound portion;

and a helical guide mounted on said internal cylinder surface for driving said helically wound portion along said pipe thereby to form said helically wound lining layer on said inside surface either of said pipe or of a previously laid lining layer.

37 An apparatus for lining a pipe with a tubular containment layer comprising:

a formation portion comprising at least one rounding die for forming a sheet of lining material into a substantially cylindrical tubular structure.

38 An apparatus as claimed in claim 37 wherein the formation portion further comprises:

at least one formation die for forming a sheet of lining material into a flattened tubular structure;

the rounding die being located for forming said flattened tubular structure into said substantially cylindrical tubular structure.

39 A welding apparatus for seam welding a containment layer in a pipe the apparatus comprising:

a mobile unit configured for longitudinal travel down said pipe;

said mobile unit comprising at least one seam welding head for welding a seam of said containment layer.

40 A welding apparatus as claimed in claim 39 wherein the mobile unit further comprises at least one further welding head for welding said containment layer to an underlying structural layer.

41 A welding apparatus as claimed in claim 39 or 40 wherein, the or each welding head comprises an infra-red source for inducing heat thereby to cause said welding.

- 42 A welding apparatus as claimed in claim 39 or 40 wherein, the or each welding head comprises an ultrasound source for inducing heat thereby to cause said welding.
- 43 A welding apparatus as claimed in any of claims 39 to 42 wherein, the or each seam welding head includes a pressurising fan for applying air pressure to said seam during welding.
- 44 A welding apparatus as claimed in any of claims 39 to 43 wherein the or each seam welding head comprises a shield portion for preventing a longitudinal portion of said seam from being welded, thereby to form a fluid impermeable conduit.
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